What is claimed is:

1. A position/orientation detecting device for detecting a three-dimensional position/orientation of an object based on two-dimensional images of the object taken from a plurality of different visual points, comprising:

defining means for defining two-dimensional taught models of the object and at least three reference points on the respective two-dimensional taught models;

image detecting means for detecting images of the object in each of the two-dimensional pictures by matching using said two-dimensional taught models;

corresponding image determining means for determining correspondence between the image detected in one of the two-dimensional pictures and the image detected in another one of the two-dimensional pictures;

reference point position calculating means for obtaining a position of each of the reference points on each of the detected images using positions of the reference points defined on the two-dimensional taught models; and

three-dimensional position/orientation determining means for obtaining three-dimensional position of each of the reference points based on the obtained position of each of the reference points on each of the detected images, and determining the three-dimensional position/orientation of the object using the obtained three-dimensional positions of the reference points.

2. A position/orientation detecting device according to claim 1, wherein said image detecting means includes means for preparing variable two-dimensional taught models by performing a geometrical transformation represented by a set of parameters on the two-dimensional taught model, and detecting images of objects in each of the two-dimensional pictures using said variable two-dimensional taught models, and

said reference point position calculating means includes means for obtaining the position of each of the reference points on each of the images based on values of the set of the parameters determined in detecting each of the images.

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3. A position/orientation detecting device according to claim 2, wherein the set of parameters includes parameters representing affine transformation to be performed on the two-dimensional taught models.

4. A position/orientation detecting device according to claim 2, wherein the set of parameters includes parameters representing perspective transformation to be performed on the two-dimensional taught models.

5. A position/orientation detecting device according to claim 1, wherein said image detecting means includes means for preparing variable two-dimensional pictures by performing a geometrical transformation represented by a set of parameters on the two-dimensional pictures, and detecting images of objects in each of the variable two-dimensional pictures using said two-dimensional taught model, and

said corresponding image determining means and said reference point position calculating means includes means for obtaining position of each of the reference points on each of the images before the geometrical transformation based on values of the set of the parameters determined in detecting each of the images.

6. A position/orientation detecting device according to claim 5, wherein the set of parameters includes parameters representing affine transformation to be performed on the two-dimensional images.

7. A position/orientation detecting device according to claim 5, wherein the set of parameters includes parameters representing perspective transformation to be performed on the two-dimensional images.

8. A position/orientation detecting device according to claim 1, wherein said at least three reference points are defined by a figure having fixed three-dimensional positional relationship with respect to the two-dimensional taught model.

9. A position/orientation detecting device according to claim 1, to be combined with a robot to constitute an object picking-up apparatus for picking up an object based on three-dimensional position/orientation of the object using the position/orientation detecting device.

10. A position/orientation detecting device for detecting a position/orientation of each of a plurality of objects of the same kind based on two-dimensional pictures of the plurality of objects taken from a plurality of different visual points, comprising:

defining means for defining two-dimensional taught models of the objects and at least three reference points on the respective two-dimensional taught models;

image detecting means for detecting images of one or more of the plurality of objects in each of the two-dimensional pictures by matching using the two-dimensional taught models;

corresponding image determining means for determining which one of images detected in one of the two-dimensional pictures corresponds to which one of images detected in another one of the two-dimensional pictures as images of the same object;

reference point position calculating means for obtaining a position of each of the reference points on each of the images determined as one of the images of the same object, using positions of the reference points defined on the two-dimensional taught models; and

three-dimensional position/orientation detecting means for obtaining the three-dimensional position of each of the reference points based on the obtained position of each of said reference points on each of the two-dimensional images, and obtaining the three-dimensional position/orientation of each of the objects using the obtained three-dimensional positions of the reference points.

11. A position/orientation detecting device according to claim 10, wherein said image detecting means includes means for preparing variable two-dimensional taught models by performing a geometrical transformation

represented by a set of parameters on the two-dimensional taught model, and detecting images of objects in each of the two-dimensional pictures using said variable two-dimensional taught models, and

said reference point position calculating means includes means for obtaining the position of each of the reference points on each of the images based on values of the set of the parameters in detecting each of the images.

12. A position/orientation detecting device according to claim 11, wherein the set of parameters includes parameters representing affine transformation to be performed on the two-dimensional taught models.

13. A position/orientation detecting device according to claim 11, wherein the set of parameters includes parameters representing perspective transformation to be performed on the two-dimensional taught models.

14. A position/orientation detecting device according to claim 10, wherein said image detecting means includes means for preparing variable two-dimensional pictures by performing a geometrical transformation represented by a set of parameters on the two-dimensional pictures, and detecting images of objects in each of the variable two-dimensional pictures using said two-dimensional taught model, and

said corresponding image determining means and said reference point position calculating means includes means for obtaining position of each of the reference points on each of the images before the geometrical transformation based on values of the set of the parameters determined in detecting each of the images.

15. A position/orientation detecting device according to claim 14, wherein the set of parameters includes parameters representing affine transformation to be performed on the two-dimensional images.

16. A position/orientation detecting device according to claim 14, wherein the set of parameters includes parameters representing perspective transformation to be performed on the two-dimensional images.

17. A position/orientation detecting device according to claim 10, wherein said at least three reference points are defined by a figure having fixed three-dimensional positional relationship with respect to the two-dimensional taught model.

18. A position/orientation detecting device according to claim 10, to be combined with a robot to constitute an object picking-up apparatus for picking up an object based on three-dimensional position/orientation of the object using the position/orientation detecting device.